Discontinuous Galerkin Methods for the Chemotaxis and Haptotaxis Models

Yekaterina Epshteyn
Department of Mathematical Sciences
Carnegie Mellon University
Pittsburgh, PA 15213
`rina10@andrew.cmu.edu`

Abstract: In this work, first we formulate and compare three different discontinuous Interior Penalty Galerkin methods for the two-dimensional Keller-Segel chemotaxis model. Keller-Segel chemotaxis model is the important starting step in the modeling of the real biological system. We show in the numerical tests that two of the proposed methods fail to give accurate, oscillation-free solutions.

Next, we consider the application of the successful method for the Keller-Segel model to the simulation of the more realistic, and closely related haptotaxis model of tumor invasion into healthy tissues.